Bellwork: 5/22/13

Solve each equation:

1) $\log_2(2x+16) = 3$

$2^3 = 2x+16$

$8 = 2x+16$

$-16 \quad -16$

$-8 = 2x$

$x = -4$

2) $\log_5(x^2-7x) = \log_5 30$

$x^2-7x = 30$

$x^2-7x-30 = 0$

$(x-10)(x+3) = 0$

$x = 10, -3$

Type 3: LOG + LOG = # - condense to one log, swirl and solve.

10) $\log_3 8 + \log_3 6x = 5$

$\log_3 8 \cdot 6x = 5$

$\log_3 48x = 5$

$3^5 = 48x$

$\frac{243}{48} = \frac{48x}{48}$

$\frac{81}{16} = x$

11) [illegible]

12) $\log x + \log(x+21) = 2$

$\log x(x+21) = 2$

$\log_{10} x^2+21x = 2$

$10^2 = x^2+21x$

$100 = x^2+21x$

$x^2+21x-100=0$

$(x+25)(x-4)=0$

$x = -25, 4$

$x = 4$

$\log\Theta$ = can't happen

Try these:

13) $\log x + \log 5 = 2$

$\log_{10} 5x = 2$

$10^2 = 5x$

$100 = 5x$

$x = 20$

14) $\log_4 25 - \log_4 x^2 = 1$

$\log_4 \frac{25}{x^2} = 1$

$x^2 \cdot 4^1 = \frac{25}{x^2} \cdot x^2$

$4x^2 = 25$

$4x^2-25=0$

$(2x+5)(2x-5)$

$x = -\frac{5}{2}, \frac{5}{2}$

works!

Type 4: LOG + LOG = LOG – condense two logs to one, then cancel and solve.

15) $\log_5 x - \log_5 6 = \log_5 16$

$\log_5 \frac{x}{6} = \log_5 16$

$\frac{x}{6} = 16$

$x = 96$

16) $\log(x+1) + \log x = \log 12$

$\log (x+1)x = \log 12$

$x^2 + x = 12$

$x^2 + x - 12 = 0$

$(x+4)(x-3) = 0$

$x = 3, -4$

$x = 3$

Try these:

17) $\log_4 x - \log_4 3 = \log_4 24$

18) $\log(x-3) + \log x = \log 4$

$\log x(x-3) = \log 4$

$x^2 - 3x = 4$

$x^2 - 3x - 4 = 0$

$(x-4)(x+1) \quad x = 4, -1$

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(18) $\log x + \log 7 = \log 37$

$\log 7x = \log 37$

$7x = 37$

$x = \frac{37}{7}$

(19) $\log_8 2 + \log_8 4x^2 = 1$

$\log_8 2 \cdot 4x^2 = 1$

$\log_8 8x^2 = 1$

$8^1 = 8x^2$

$8 = 8x^2$

$8x^2 - 8 = 0$

$8(x^2 - 1) = 0$

$(x-1)(x+1) = 0$

$x = 1, -1$

(20) $\log_9 (x+6) - \log_9 x = \log_9 2$

$\log_9 \frac{x+6}{x} = \log_9 2$

$\frac{x+6}{x} = 2$

$x + 6 = 2x$

$-x \quad -x$

$6 = x$

(21) $\log_6(x+1) - \log_6 x = \log_6 29$

$\log_6 \frac{x+1}{x} = \log_6 29$

$x \cdot \frac{x+1}{x} = \frac{29}{1} x$

$x = \frac{1}{28}$

$29x = x + 1$

$-x \quad -x$

$\frac{28x}{28} = \frac{1}{28}$

(22) $\log_5 6 + \log_5 2x^2 = \log_5 48$

$\log_5 6 \cdot 2x^2 = \log_5 48$

$\log_5 12x^2 = \log_5 48$

$12x^2 = 48$

$12x^2 - 48 = 0$

$12(x^2 - 4) = 0$

$(x-2)(x+2) = 0$

$x = 2, -2$

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Homework: pg 32 #11-20